

What is claimed is:

1. A variable capacitor comprising:

a beam having flexibility; and

an electrode provided close to the beam;

whereby, by applying a voltage to between the beam and the electrode to thereby deflect the beam on an electrostatic force, a capacitance between the beam and the electrode is changed.

2. A variable capacitor according to claim 1, wherein the deflected beam and the electrode are placed in contact through an insulation layer formed on a surface of at least one thereof, to change a contact area thereof.

3. A variable capacitor according to claim 1, wherein the electrode is divided into a plurality in the number.

4. A variable capacitor according to claim 3, wherein the electrode is divided into two, a first electrode being formed with an alternating current signal line provided with an input port and output port, to apply a voltage to between a second electrode and the beam.

5. A variable capacitor according to claim 4, wherein the second electrode is to support a free end of the beam by attraction with an electrostatic force.

6. A variable capacitor according to claim 4, wherein the second electrode is arranged closer to the beam than the first electrode.

7. A variable capacitor according to claim 1, wherein the electrode has a surface in parallel with a deflecting direction and lengthwise direction of the beam in a deflected state released of residual stress, the electrode having a geometry greater than a geometry of a side surface of the beam opposed to the electrode.

8. A variable capacitor according to claim 1, wherein the beam is a cantilever.

9. A variable capacitor according to claim 1, wherein the variable capacitor is vacuum-sealed.

10. A switch utilizing a variable capacitor structure of the variable capacitor according to claim 1.

11. A variable capacitor according to claim 1, wherein the beam is a both-ends-supported beam, the electrode being divided into a plurality in the number, one divided electrode having a surface formed distant farer from a surface of the beam than a surface of another electrode.

12. A variable capacitor according to claim 11, wherein each of the electrodes divided in plurality has an insulation layer provided on a surface thereof, the insulation layer of one electrode having a surface formed distant farer from a surface of the beam than a surface of the insulation layer of another electrode.

13. A variable capacitor according to claim 12, wherein one electrode is removed of the insulation layer in a surface opposed to the beam, the one electrode being distant farer from a surface of the beam than a surface of the insulation layer of another electrode.

14. A variable capacitor according to claim 11, wherein the surface of the insulation layer of the one electrode is distant farer from the surface of the beam than the surface of the insulation layer of another electrode thereby forming a recess at between the one electrode and the beam, so that, by applying a voltage to between the one electrode and the beam and thereby pulling the beam in the recess, a force can be generated to separate an opposite position of the beam from the electrode with respect to, as a fulcrum, a step generating point in a part of the recess.

15. A variable capacitor according to claim 11, wherein the variable capacitor is vacuum-sealed.

16. A switch utilizing a variable capacitor structure of the variable capacitor according to claim 11.

17. A method for manufacturing a variable capacitor comprising:

a step of forming a sacrificial layer on a substrate;

a step of forming a beam material over an entire surface of the substrate by sputtering;

a step of forming a mask pattern over said beam material;

a step of carrying out dry etching using the pattern as a mask and form a beam; and

a step of removing the pattern and the sacrificial layer.

18. A method for manufacturing a variable capacitor according to claim 17, further comprising a step of forming a first silicon oxide film on the substrate and thereafter depositing a silicon nitride film, to form a sacrificial layer on the silicon nitride film.

19. A method for manufacturing a variable capacitor according to claim 18, further comprising a step of depositing a second silicon oxide film on the silicon nitride film, to form a sacrificial layer on the second silicon oxide film.